Claims

1. A method for receiving a multi-carrier signal, the method comprising the steps of:

detecting a presence of at least one impulse interference within the signal,

blanking samples where significant amount of the impulse noise caused by the at least one impulse interference is present to obtain a signal with blanking,

determining an estimate of the signal with blanking,

determining carrier correction values, which carrier correction values are based on deviations of certain carrier values compared to prior known information, and the blanking, and

influencing the estimate by the carrier correction values to obtain a representation of a desired signal.

2. A method according to claim 1, wherein the step of determining the estimate comprises the step of calculating the estimate by a time domain to frequency domain transform of the signal with the blanking and temporarily storing the estimate.

3. A method according to claim 1, wherein the step of determining the carrier correction values comprises the steps of

calculating a difference between observed pilot values and known values for pilot carriers,

calculating weight values corresponding to blanking window position, and applied pilot based system,

calculating the carrier correction values based on the difference and the weight values for each carrier, and

calculating the corrected estimate by computing the carrier correction values with the stored estimate.

4. A method according to any of the preceding claims, further comprising before the step of determining the estimate, the step of shifting sampled signal in such a way that a blanking window is substantially centred at first sample position, and

compensating the phase shift for each carrier before forwarding a corrected estimated signal.

5. A method according to any claim of the preceding claims, wherein the step of detecting is based on a sliding window calculation.

6. A method according to any claim of the preceding claims, wherein the step of detecting is based on monitoring an exceeding of a threshold in amplitude of the signal.

7. A method according to claim any claim of the preceding claims, wherein the step of detecting is based on monitoring amplitude variations.

8. A method according to any claim of the preceding claims, wherein the step of blanking comprises blanking a predetermined amount of digital values substantially coincident with the impulse interference.

9. A method according to any claim of the preceding claims, wherein the step of blanking comprises a predetermined set of blanking window positions.

10. A method according to any claim of the preceding claims, wherein the step of blanking comprises blanking digital values which coincide with the impulse interference.

11. A method according to any claim of the preceding claims, wherein the step of blanking is based on an appliance of position and duration of the impulse interference.

12. A method according to any claim of the preceding claims, wherein the step of blanking comprises blanking digital values directly affected by the impulse interference and digital value neighbouring the impulse interference.

13. A method according to any claim of the preceding claims, wherein a blanking window comprises at least one of a rectangular blanking window, and a blanking window with smooth transitions at end.

14. A method according to claim any claim of the preceding claims, wherein the carrier correction values are calculated for various carriers based on various pilot values.

15. A method according to claim any claim of the preceding claims, wherein the carrier correction values are calculated based on two closest pilots.

16. A method according to claim 15, wherein a covariance function is applied in the calculation of the carrier correction values.

17. A method according to claim 16, wherein location of a blanking window is taken in account in deriving the covariance function.

18. A method according to claim 16, wherein input samples are shifted in such a way that location of blanking window is substantially centred at first sample.

19. A method according to any claim of the preceding claims, wherein the certain carrier values comprises observed pilot carrier values of the received signal affected by the impulse interference.

20. A method according to any claim of the preceding, wherein the prior known information comprises previously received pilot carrier values.

21. A method according to claim 20, wherein the previously received pilot carrier values comprise transmitted pilot values multiplied with a channel estimate on pilot frequencies.

22. A method according to claim 21, wherein the previously received pilot carrier values are not affected by impulse interference.

23. A method according to any claim of the preceding claim, wherein the prior known information comprises interpolated pilot carrier values, wherein the interpolated pilot carrier values are obtained from a set of received OFDM symbols, wherein certain pilot carrier values affected by the impulse interference is interpolated based on pilot carrier values received before and after the certain pilot carrier values.

24. A method according to claim 23, wherein the pilot carrier values are multiplied with a channel estimate on respective pilot frequencies.

25. A method according to claim 24, wherein the before and after received pilot carrier values are not affected by impulse interference.

26. A method according to any claim of the preceding claims, wherein the pilot carrier values are contained in at least one OFDM symbol of the received signal.

27. A method according to claim any claim of the preceding claims, wherein the multi-carrier signal comprises OFDM signal.

28. A method according to claim 27, wherein the OFDM signal is operable in at least one of a DVB system, a terrestrial DVB system and a ISDB-T system.

29. A receiver for receiving a multi-carrier signal, the receiver comprising:

a first circuitry for detecting a presence of at least one impulse interference within the signal,

a second circuitry for blanking samples where significant amount of the impulse noise caused by the at least one impulse interference is present to obtain a signal with blanking, and for determining an estimate of the signal with blanking,

a third circuitry for determining carrier correction values, which carrier correction values are based on deviations of certain carrier values compared to prior known information, and the blanking, and

a fourth circuitry for influencing the estimate by the carrier correction values to obtain a representation of a desired signal.

30. A receiver according to claim 29, wherein the multi-carrier signal comprises OFDM signal.

31. A receiver according to claim 30, wherein the OFDM signal is operable in at least one of a DVB system, a terrestrial DVB system and an ISDB-T system.

32. A receiver according to claim 29, wherein the receiver further comprises means for interaction with a service provider providing the signal.

33. A receiver according to claim 32, wherein the means for interaction comprises a cellular mobile module operable under coverage of a cellular mobile network.

34. A receiver according to claim 29, wherein the second circuitry for determining the estimate comprises circuitry for performing a time domain to frequency domain transform of the signal with blanking.

35. A receiver according to claim 34, wherein the third circuitry for determining the carrier correction values is adapted to:

calculate a difference between observed pilot values and known values for pilot carriers,

calculate weight values corresponding to blanking window position, and applied pilot based system,

calculate the carrier correction values based on the difference and the weight values for each carrier, and

calculate the corrected estimate by computing the carrier correction values with the stored estimate.

36. A receiver according to claim 29, further comprising a broadcast multi-carrier signal receiving module.

37. A receiver according to claim 29, wherein the receiver comprises a user terminal for obtaining at least one service which is received within the signal.

38. A system for receiving a multi-carrier signal, the system comprising:

means for detecting a presence of at least one impulse interference within the signal,

means for blanking samples where significant amount of the impulse noise caused by the at least one impulse interference is present to obtain a signal with blanking,

means for determining an estimate of the signal with blanking,

means for determining carrier correction values, which carrier correction values are based on deviations of certain carrier values compared to prior known information, and the blanking, and

means for influencing the estimate by the carrier correction values to obtain a representation of a desired signal.

39. A system according to claim 38, wherein the system comprises at least one of a DVB system, a terrestrial DVB system and an ISDB-T system.

40. A computer program product comprising a program of instructions executable by a computing system for processing a reception of a broadcast multi-carrier signal, the computer program product comprising:

computer program code for causing the system to detect a presence of at least one impulse interference within the signal,

computer program code for causing the system to blank samples where significant amount of the impulse noise caused by the at least one impulse interference is present to obtain a signal with blanking,

computer program code for causing the system to determine an estimate of the signal with blanking,

computer program code causing the system to determine carrier correction values, which carrier correction values are based on deviations of certain carrier values compared to prior known information, and the blanking, and

computer program code for causing the system to influence the estimate by the carrier correction values to obtain a representation of a desired signal.

41. A method for receiving an OFDM signal, the method comprising the steps of:

detecting a presence of at least one impulse burst,

blanking samples which are affected by the at least one impulse burst,

calculating a time domain to frequency domain transform of the signal with the blanked samples to obtain an estimate,

calculating a difference between observed pilot values and known values for pilot carriers,

calculating weight values coinciding with a blanking window position,

calculating carrier correction values based on the difference and the weight values for each carrier, and

subtracting the carrier correction values from the estimate to obtain a representation of a desired signal.

42. A method according to claim 41, wherein the weight values are calculated based on the following formulae:

$\underline{w} = \left(\underline{\underline{C}}_p\right)^{-1} \underline{c}_b(k)$, wherein w denotes the weight values, C_p denotes the pilot deviations, and $c_b(k)$ denotes carrier index values.

43. A method according to claim 41, wherein the carrier correction values are calculated based on the following formulae:

$b_k = \underline{w}^T \underline{P}$, wherein b_k denotes the carrier correction values, w denotes the weight values, and P denotes pilot deviation values.